



# Year 2005 Progress Report of Activities



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E. "Kika" de la Garza Plant Materials Center

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The Kika de la Garza Plant Materials Center (PMC) is a 91-acre facility established to provide cost-effective vegetative solutions for soil and water conservation problems. This means identifying plants and developing techniques for successful conservation use. It also means assisting in the commercial development of these plants and promoting their use in natural resource conservation and other environmental programs.

The PMC was established in 1981. It is one of 27 centers located throughout the United States. The PMC is operated by the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), in cooperation with an Advisory Board from Texas A&M University-Kingsville, the Caesar Kleberg Wildlife Research Institute (CKWRI), South Texas Association of Soil & Water Conservation Districts, and the Gulf Coast Association of Soil & Water Conservation Districts. The Kika de la Garza PMC serves approximately 27 million acres of the southern portion of Texas.

## Program Emphasis

The mission of the Kika de la Garza PMC is to develop and transfer plant science technology to solve natural resource problems in the South Texas area. Plant testing and plant selection as well as the development of new plant science technologies are the primary products of our program. The PMC conducts plantings and studies at the Center and off-Center with cooperating partners. The PMC works with NRCS Field Offices and Resource Conservation and Development (RC&D) groups, Conservation Districts, federal and state agencies, and private landowners.

Our current program emphasis at the PMC is in the following areas:

- Rangeland Habitat Restoration and Enhancement
- Coastal Shoreline Stabilization
- Coastal Habitat Restoration and Enhancement
- Erosion Control/Water Quality Improvement on Agricultural Land

Following are highlights of some of the activities of the PMC for 2005. Please contact the PMC for more detailed information.

## Rangeland Habitat Restoration and Enhancement

### *South Texas Natives Project:*

The goal of the South Texas Natives Project (STN) is to provide economically viable sources of native plants and seeds and to develop effective planting strategies for the restoration of South Texas plant



Clammyweed

communities. As a partner in this initiative, the Kika de la Garza Plant Materials Center has established a nursery of South Texas ecotypes of a variety of grasses, forbs, and legumes. Ecotypes are developed for 3 basic regions: the Gulf Coast Prairie, the South Texas Plain and the Coastal Sand Plain. The ecotype regions were established to be large enough to support a commercial seed market, but small enough to retain regional integrity and genetic adaptability. The nurseries consist of approximately 20 collections of each species per ecoregion. Transplants are established in isolated areas as necessary to maintain species integrity and diversity. The nurseries are hand harvested to ensure a complete spectrum of seed is harvested from each species. Ecotypic seed is then planted in production fields where it is harvested and bulked per species for each ecoregion. The ecoregion seed is then made available to commercial seed growers.

In 2005, we received 2 collections from the STN Project representing 2 species. These 2 collections overlap in representing the South Texas Plain Ecoregion and the Coastal Sand Plain Ecoregion.

Since 2001, we have received 1,557 collections for the South Texas Plain Ecoregion and 218 collections representing the Coastal Sand Plain Ecoregion. The seed nursery was expanded in 2005 to include 679 accessions in 2004, representing 35 species.

In December 2005, we seeded trays to add to the seed nursery. This included 133 collections representing 17 species for the South Texas Plain and Coastal Sand Plain Ecoregions, and 53 collections representing 9 species for the Gulf Coast Prairie Ecoregion. These seedlings will be planted both on and off-site for evaluation and seed production.



Over the past two years the focus of South Texas Natives has shifted from collecting to evaluation. They now have six evaluations sites across South Texas. They have 267 accessions representing 15 species at Rio Farms, 195 accessions representing 8 species at the Texas Agricultural Experiment Station Uvalde, 210 accessions representing 8 species at Rancho Blanco, 16 accessions representing 4 species at the CKWRI Wildlife Complex, 63 accessions representing 6 species at Bladerunner Farms and 40 accessions representing 7 species at Texas Agricultural Experiment Station Beeville.



**Upcoming Plant Releases**

Pending approval the PMC, STN, and TAES Beeville have 10 cooperative releases anticipated for September 2006.

The PMC is the lead on the following 6 releases:

- 1) Welder Germplasm shortspike windmillgrass *Chloris subdolichostachya*  
Anticipated Select Release Accession # 9085260
- 2) Mariah Germplasm hooded windmillgrass *Chloris cucullata*  
Anticipated Select Release Accession # 9085313

- 3) Kika648 Germplasm plains bristlegrass *Setaria vulpiseta*  
Anticipated Select Release Accession # 9029648
- 4) Kika677 Germplasm streambed bristlegrass *Setaria leucopila*  
Anticipated Select Release Accession # 9029677
- 5) Kika819 Germplasm streambed bristlegrass *Setaria leucopila*  
Anticipated Select Release Accession # 9038819
- 6) Kika820 Germplasm streambed bristlegrass *Setaria leucopila*  
Anticipated Select Release Accession # 9038820

The four bristlegrass releases will be combined prior to sale and sold under the name Catarina Germplasm bristlegrass.



STN is the lead on the following 4 releases:

- 7) Dilley Germplasm slender grama *Bouteloua repens* 4 combined accessions
- 8) Chaparral Germplasm hairy grama *Bouteloua hirsuta* 4 combined accessions
- 9) Atascosa Germplasm Texas grama *Bouteloua rigidiseta* 4 combined accessions
- 10) La Salle Germplasm Arizona cottontop *Digitaria californica* 12 combined accessions



**The Gulf Coast Ecotype Project:**

In 2001, an initiative was begun between the US Fish and Wildlife Service, CKWRI, the Gulf Coast Association of Soil and Water Conservation Districts, the STN Project, and the Kika de la Garza PMC to produce native, eco-typic plant material to displace invasive species on pastures and agricultural fields, along the Texas Gulf Coast. Thirteen species including 4 forbs, 1 cool season grass, and 8 warm season grasses were selected for initial collecting and evaluation. Ten to twenty-five collections of each species



Big Bluestem in Fall Color

are being made by the partners of this project, as well as a few other groups, from the 30 counties along the Texas Gulf Coast.

A nursery has been established at the PMC. Transplants have been planted in irrigated field plots where seed is hand harvested and evaluated for production, germination, and establishment. Successful collections will eventually be released for commercial production.

Since 2001, 103 collections have been received, representing all thirteen species. The field nursery now consists of 70 accessions representing 11 of the 13 species. In 2005, 10 new collections were received. In December 2005, these collections were seeded in the greenhouse. Those exhibiting good germination will be transplanted into the field beginning in the spring.

## Erosion Control/Water Quality Improvement on Agricultural Land

### *Saline Site Revegetation Trials*

There is an estimated 600 thousand acres in South Texas that are affected by saline and alkaline conditions. Many of these acres are damaged by past oil field activity. These sites are characterized by soils with high salinity, little soil structure, lack of vegetation and excessive erosion. Roadways, especially those associated with oil field activity, have created many critical and highly erodible sites. These sites generally have exposed subsoil, are low in soil fertility, have poor water holding capacity with a lack of adequate vegetative cover. Furthermore, degradation of water quality has occurred through contaminants and excessive soil erosion from saline, alkaline and other mineralized soils.

In order to solve erosion problems and increase the productivity on saline impacted range sites in the South Texas region, it is critical to know the tolerance of plant species to varying levels of salt. This assessment is necessary for seed germination and at the young seedling stage. It is also important to know how the salt levels will change with the temperature and rainfall of the different seasons. Given this information, NRCS and SWCD field personnel will become knowledgeable about adapted plant varieties and tested technology which will improve their recommendations for site improvements in the South Texas region.

Seeds germinating in salt-affected soils may be responding to dissolved salt concentration as well as to particular salts such as sodium ions. Temperature and soil moisture may interact with salinity producing a significant but highly variable environmental window for seed germination and seedling establishment. Therefore, both seed germination and young seedling responses to varying salinity levels needs to be determined.

Starting in June of 2005, LeeRoy Rock, a student at Texas A&M Kingsville, began seed germination trials at the PMC. He ran tests on 21 plant species. The first trial was run at 5 salinity levels; 0, EC-5, EC-10, EC-20, EC-30 at a constant temperature of 68 F with 12 hours of light and 12 hours of dark. The second trial was run at the same 5 salinity levels as the preceding experiment but at a constant temperature of 86 F.

Most of the species germinated better under the higher temperatures even when the salinity levels were high. Six plant species responded better than the other tested species at salt levels with an EC of 20 or greater. These were bundleflower (*Desmanthus virgatus*), orange zexmenia (*Zexmenia hispida*) and sorghum with greater than 30 % germination at temperatures at 86 F and two-flowered trichloris (*Chloris crinita*), Arizona cottontop (*Digiteria californica*) and Bermudagrass with greater than 20 % germination at temperatures at 86 F.

LeeRoy is now getting ready to initiate the seedling trials. He has set-up 3 ebb-flow tables to handle watering at an EC of 0, EC-10 and an EC-20. He has seeded 8 species and once the plants reach the 3-leaf stage these plants will be subjected to the salinity treatments.



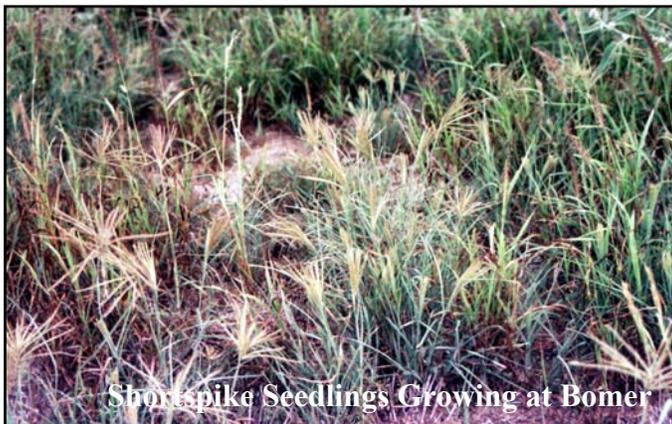
It is also important to know how the salt levels will change in the soil with

the varying temperature and rainfall of the different seasons. Therefore, LeeRoy plans to install *Decagon Devices* data logging equipment for soil moisture and soil electrical conductivity to monitor field site conditions in Zapata County in June 2006.

**Native Plant Restoration & Diversity Methods**

A field emergence study of shortspike windmillgrass (*Chloris subdolihostachya*) was established in May 2004 on a Victoria clay soil at the PMC. Ten by twenty foot flat plots were seeded at a rate of 20 PLS/ft<sup>2</sup> and replicated three times for accessions 9085260 and 9085283 and 9085313. These plots were not irrigated. Evaluation of these plots in November of 2004 indicated that accession 9085260 had the densest cover and foliage production based on ocular estimates with an average 60% cover.

A second field emergence study was established in March 2005 into a treated buffelgrass pasture at the Bomer Wildlife Area in Duval County, Texas. Aaron Tjelmeland, a graduate student at TAMUK, and the PMC are attempting to diversify dense stands of buffelgrass (*Pennisetum ciliare* (L.) Link) by interseeding native grasses. Ten meter by ten meter plots were divided in half and random halves were sprayed with 64 ounces per acre of imazapyr in November, 2004. In March 2005, both the sprayed and the unsprayed plots were seeded with a seed mix of shortspike windmillgrass (Accession 9085260), switchgrass (*Panicum virgatum*), and 4-flower trichloris (*Trichloris pluriflora*) at a rate of 10 PLS/ft<sup>2</sup> per species, replicated three times. These plots on a sandy loam soil were not irrigated. Evaluation of these plots in November of 2005 (Table 1) indicated that shortspike windmillgrass was the only seeded species that became established.



**Table 1. Species Evaluation of Imazapyr Treated Plots in November 2005 at the Bomer Wildlife Area.**

Rep	Species	% Cover on Sprayed Plots	% Cover on Unsprayed Plots
1	Buffelgrass	91	100
	Shortspike	41	0
	Annual forbs	0.3	0
2	Buffelgrass	90	97
	Shortspike	24	0
	Annual forbs	19	31
3	Buffelgrass	71	99
	Shortspike	27	2
	Annual forbs	18	11

**Coastal Shoreline Stabilization**

**Sand Dune Vegetation - Rematch**

In January 2005, the PMC coordinated with The Nature Conservancy (TNC), the South Padre Island Parks Department (SPIPD), and the U.S. Fish and Wildlife Service to form 300 feet of encapsulated soil in order to construct and vegetate a 4 foot high by 40 foot wide sand dune.

However, Hurricanes Emily and Rita in 2005 destroyed most of this dune. The fortunate aspect of the destruction of the dune is that it will allow for evaluation of some new construction methods. The PMC will reconstruct a dune 220 feet long on the same site in March of 2006. The new dune will include the use of coconut fiber bales, coconut fiber blocks with matting, and also “concertainers,” metal cases filled with sand and covered with coconut fiber. The dune will also be used to compare the success of plant material from a population near Corpus Christi and from a population near the dune. The effect of irrigation and hydrogel techniques on plant survival will also be evaluated.



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